
Winterfat, Saltbush - Forage Shrubs for the Canadian Prairies

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What are they?

Winterfat (*Krascheninnikovia lanata*), also known as lambstail, sweet sage, white sage, winter sage or feather sage, has been recommended as a highly palatable, nutritious, and, salt and drought tolerant native shrub. This species provides excellent forage to livestock and wildlife in the prairies, and is being used for wildlife habitat reclamation. Winterfat plants collected from Saskatchewan had crude protein values of 11.5% between August and December, whereas native grasses had 6.2% crude protein during that same period. This native shrub is well known to ranchers but was less studied previously by forage researchers. However, interest in utilizing this shrub for restoration and improvement of rangelands on the Canadian Prairies is increasing.

Saltbush (*Atriplex nuttallii* or *Atriplex gardneri*), also known as Nuttall saltbush or Gardeners saltbush, can be used as winter forage by livestock and is fairly palatable to cattle. In most parts of the world where there is saltland or draught conditions, saltbush species are an important forage utilized by browsing livestock. Saltbush has been grazed for centuries both as native and artificially established stands. Many producers consider revegetated saltland by saltbush as a valuable forage reserve which retain their nutritional value. In southwestern Saskatchewan, saltbush plants have exhibited higher protein and phosphorous content than native grasses between August and December. Historical records suggest it was once prevalent as a native shrub in the prairie landscape but it is less evident today. Season long stocking allows cattle to preferentially graze this species thus decreasing the plant survival and forage production in the field. However, this shrub is known as being a valuable component of winter grazing lands in the Walsh flats on Saskatchewan-Alberta border.

Where do they grow?

Geographical Location

Winterfat is found as native shrub across the Canadian prairies, north to southeast Yukon, south to California, Texas and Mexico. Winterfat is capable of rapid growth under harsh conditions. Therefore, it can quickly establish on disturbed lands reclamation or range revegetation. It can withstand annual rainfall of less than 12 cm. Winterfat has been recognized as good dryland forage worthy of cultivation. This 'silvery or silvery blue appearance' shrub's (Plate 1) stems die back in winter, leaving a woody basal plant. Winterfat regrowth starts in April to May. Mature plants can be 20 to 75 cm tall depending on the source of the seed and establishment site. The shrub grows in solid or sparse stands with pinyon or juniper or in grasslands at elevations between 1200 and 3000 meter in the US. It can tolerate temperatures as low as -30°C.

Nuttall's saltbush is a perennial native dryland shrub that is found from British Columbia to Manitoba and on the Northern Great Plains in the United States. Other species can be found

throughout the Great Plains. A sampling of rangelands within PFRA community pastures and Grasslands national Park indicates that the most productive saltbush shrubs are found on south facing slopes in sandy soils with cobble stones in association with blue grama grass (Plate 2). The shrub generally grows between 600 to 2500 meter elevation and because of its relatively low moisture requirement, it can often withstand annual precipitation as low as 12 cm.



Plate 1



Plate 2

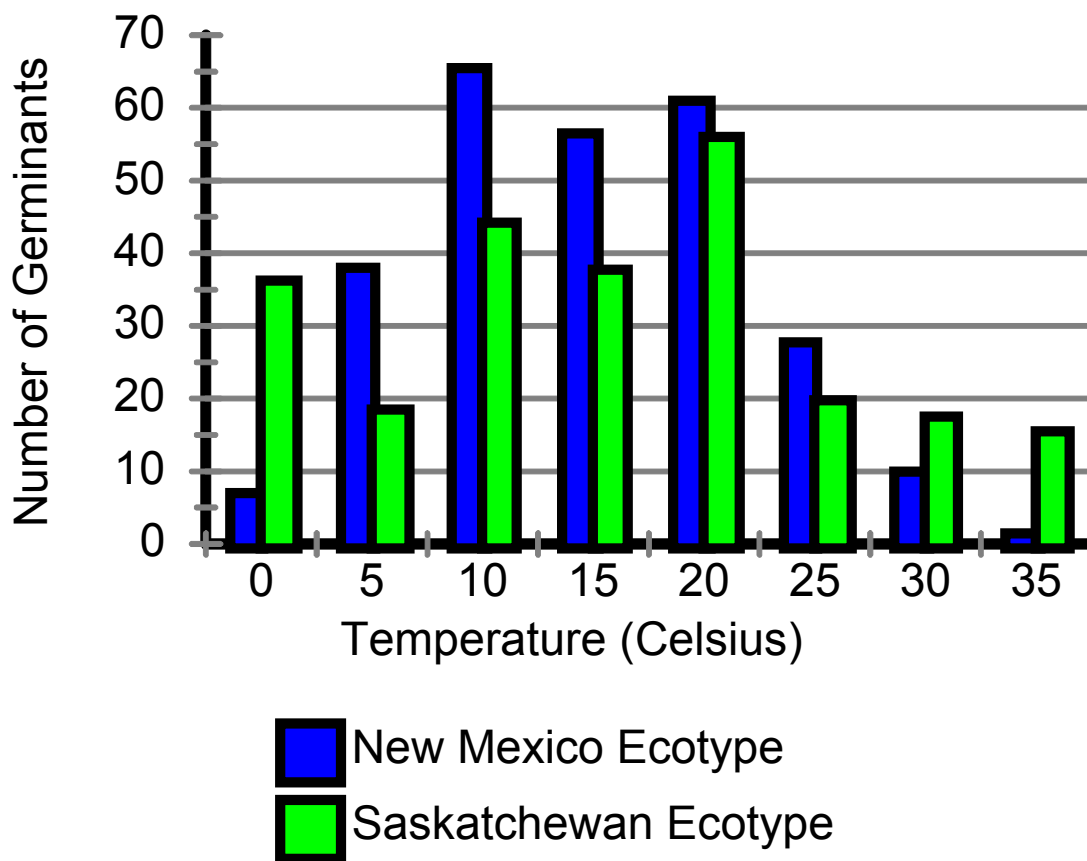
Soil Characteristics

Winterfat, a dominant species in the salt-desert, is dependable indicator of soil conditions. It can tolerate salinity and can grow in all types of well-drained soils. It grows well in fine-textured soils and accommodates clay to rocky soils with a pH of 7.4 to 8.

Saltbush, generally tolerant to almost any soil texture from sandy to clay, is usually found in medium to fine-textured, saline/alkaline soils. It is useful for the revegetation of erosive, draughty, saline/alkaline soils. It can even be found on clay soils with high salt and sodium contents where nothing else can grow.

Where do you find the seed?

Winterfat	Canada	Ducks Unlimited Ecovar™ developed at SPARC now in increase.
		A few nurseries have seed available in small quantities.
	US	Hatch a licensed variety.
		Wild collections are the main source of seed.
Saltbush	Canada	Wild collected seed <i>Atriplex gardneri</i> (<i>A. nuttallii</i>) most common perennial for Canadian Prairies.
	US	<i>A. gardneri</i> wild collected.
		Several other <i>Atriplex</i> species have registered cultivars. <i>A. canescens</i> has had the greatest amount of work but problems with adaptation to the Canadian Prairies common.



Is there difference in seed characteristics?

Adaptation to Canadian prairie climate is often an issue for seed sourced outside Canada. Germination temperature range tests, tool for determining seed adaptability, were done only for winterfat. Saskatchewan seeds had better adaptability to wider ranges of temperature at which greater than 15% of seeds were germinated (Figure 1). Thus, this locally sourced winterfat seeds may have greater potential for wider adaptability.

Extended grazing and they!!

Late season grazing has been considered as a method of decreasing the cost of beef production in the southern parts of western provinces of Canada. The quality of available forage in fall and winter generally restricts the grazing season. Grasses are usually the main forage source even though they are not the only source of herbage during that period. Research has shown that native shrubs (like winterfat and saltbush), and forbs have higher nutritional value than grasses in fall. Cost of beef production can be reduced by up to 56% by overwintering cattle on winter pasture. Thus, it would be beneficial for livestock producers to have high quality, late season forage with low cost of input. One method of improving late season grazing is just to utilize native shrubs (e.g. winterfat and saltbush) and legume species (e.g. alfalfa) together which maintains higher nutritional quality in the fall.

Figure 1. Germination temperature differences between US and Canadian sourced seeds.

Shrub-legume mixture - is it a possibility?

To develop a potential forage source with winterfat and saltbush species, one requires a clearer understanding of optimum mixtures of legumes and shrubs. In the Canadian Prairies, popularity of alfalfa (*Medicago sativa*) as forage crop has been increasing quite significantly. Growing a monoculture of alfalfa alone is not widely accepted among producers due to risk of bloat in cattle. A pasture with mixed species such as a shrub (winterfat or saltbush) and a legume (alfalfa) may well be suited for this purpose. Thus, a pasture with an ideal mixture would produce higher forage and livestock yield as well as provide late season grazing with low cost of production.

In 1998, the SPARC-AAFC forage research group, initiated a study to optimize the mixtures of legumes and shrubs for quality forage production in the southwest Saskatchewan. The study (Plates 3, 4 and 5) indicates that a pasture with a mixture of shrubs and legumes (alfalfa + winterfat and/or alfalfa + saltbush) can potentially provide a diversified forage source, extend grazing period, produce higher yields than when grown separately with enhanced or similar forage quality. However, long-term field study is needed (which is already underway) before the true benefit can be established satisfactorily.



Plate 3



Plate 4



Plate 5

Overall potential

- Winterfat with its high nutritional value and wide geographic region of adaptation, make it a potentially beneficial shrub for forage production and soil stabilization in the southern Canadian prairies.
- Saltbush establishment is suggested as one of the better ways to rehabilitate degraded sites and restore them to production. It would be beneficial to include saltbush into new, man-made agro-pastoral systems of livestock production well adapted to Canadian semiarid prairies.
- The potentials of shrubs and forbs for improving rangelands productivity have long been recognized but generally have been overlooked. Range improvement programs should include selected shrubs and forbs because of their adaptation to harsh environments, high productivity, influence on wildlife habitat, protection of rangeland watersheds, and general contribution to the proper functioning of rangeland ecosystems.

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